U.S. Department of
Homeland Security
United States
Coast Guard

Commandant
United States Coast Guard

2100 Second Street, S.W.
Washington, DC 20593-0001
Staff Symbol: G-SCE-2
Phone: (202) 267-1245

COMDTINST 4790.2B
SEP 10 2003

COMMANDANT INSTRUCTION 4790.2B

Subj: COAST GUARD MINIATURE/MICROMINIATURE (2M)/MODULE TEST AND REPAIR (MTR) PROGRAM

Ref:
(a) Supply Policy and Procedures Manual (SPPM), COMDTINST M4400.19 (series)
(b) Naval Supply Publication 485, NAVSUP P-485
(c) Certification Manual for 2M/MTR Program Miniature/Microminiature (2M)/Module Test and Repair (MTR), NAVSEA TE000-AA-MAN-010/ NAVAIR SE-004-PQS-000
(d) Ordnance Manual, COMDTINST M8000.2 (series)
(e) Naval Engineering Manual, COMDTINST M9000.6 (series)
(f) Electronics Manual, COMDTINST M10550.25 (series)

1. PURPOSE. This Instruction defines the maintenance policies and procedures for test and repair of electronic modules (EMs) and circuit card assemblies (CCAs) contained in Hull, Mechanical, and Electrical (HM&E), Navy-Type Navy-Owned (NTNO), and Navy-Type Coast-Guard Owned (NTCGO) equipment. It applies to Coast Guard (CG) activities involved in the maintenance and material support of this equipment.

2. ACTION. Area and district commanders, commanders of maintenance and logistics commands (MLC), commanding officers of headquarters units, assistant commandants for directorates, Chief Counsel, and special staff offices at Headquarters shall ensure compliance with the provisions of this Instruction. Internet release authorized.

3. DIRECTIVES AFFECTED. Coast Guard Module Test and Repair (MTR) Program, COMDTINST 4790.2A is cancelled.

4. DISCUSSION.

DISTRIBUTION – SDL No 140

	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s	t	u	v	w	x	y	z
A	3	3	1		1	1	1		1	1			1	1	1	1					1					
B		2	4	1	4	2			2		2	1	3	2	1	1		3	3		1	2		1	3	
C	1	1		1	1	1	1		1		2	2		1			1					1	1	2		
D	1							1	1				1							3						
E				1				2																		
F																										
G			1	1	1																					
H																										

NON-STANDARD DISTRIBUTION: NUWC (det) Norfolk (201V) 1
NSWC Crane Division (6083) 1
NAVSEA (04M32) 1

a. Program Objective. The 2M/MTR Program is designed to improve equipment Operational Availability (A_O) and eliminate the turn-in of no failure evident (NFE) of certain EMs and CCAs [hereafter referred to as Electronic Assemblies (EAs)], to the depot. Additionally, the program provides technicians at the operational and intermediate levels an additional tool to troubleshoot complex systems that do not have adequate maintenance assist modules (MAMs) onboard, and the ability to screen and repair faulty EAs if appropriate. Doing test and repair at the lowest level enhances ship sustainability and helps to ensure optimum economic use of resources in achieving maximum operational readiness.

b. Program Components. The program has two distinct components:

(1) The MTR Program develops and provides electrical/electronic module test and repair capabilities to organizational (O-level) and intermediate (I-level) maintenance facilities for both ashore and afloat commands. MTR involves screening suspected faulty EAs to confirm the presence of a fault and then identifying the failed component(s). This involves interpreting both the visual condition and electrical characteristics of EAs and individual components and comparing the characteristics of suspected faulty EAs with baseline characteristics stored in a locally accessible database.

(a) Historically, even though there were highly trained personnel aboard most surface ships and many shore facilities, the failed EAs were returned to depot sites for repair. The MTR Program established dedicated, structured work centers to repair these EAs at a significant cost reduction and increase in equipment up time. These dedicated work centers are comprised of selected General Purpose Electronic Test Equipment (GPETE), 2M-repair station, trained technicians from existing billeted personnel, documentation, and reporting procedures.

(b) Major factors in the success of the MTR work center are the Huntron 2000, AN/USM-646(V), and AN/USM-674(V) Test Stations. The Huntron 2000 works by applying a current-limited AC signal across two points of a component that provides a unique analog signature, which represents the overall health of the device under test. The AN/USM-646/674(V) Test Stations are designed to be used with an IBM compatible Personnel Computer (PC), which is part of the GPETE and not counted as part of the microcomputer allowance. The test stations are software driven by the PC and are capable of digitizing the analog signatures for storage by the PC. This enables a technician to learn and save the signatures of a good EA and utilize the stored information to fault isolate defective EAs. The Navy's In Service Engineering Agent (ISEA) has developed the signature diagnostic data, logistics information, schematic diagrams, and graphic assembly drawings into a paperless software package labeled a "Gold Disk." A Gold Disk is developed for each individual EA.

(c) The MTR configuration is not static. As new techniques for repair are available, they are evaluated and institutionalized into the MTR.

(2) 2M involves rework and repair work including damaged EAs, and replacement of discrete components and integrated circuits (ICs).

(a) The 2M Program provides the repair equipment, tools, techniques and training required for certified technicians to perform highly reliable, high quality repairs on complex EAs. 2M is an integral part of the Navy's Progressive Repair initiative. The 2M Program supports electronic repair at the organizational (O) and intermediate (I) maintenance levels. The use of 2M applies to all electronic equipment following the direction of Maintenance Policy for Naval Ships, OPNAVINST 4700.7 (series), Naval Aviation Maintenance Program OPNAVINSTs 4790.2 (series), and Maintenance of Surface Ship Electronic Equipment OPNAVINST 4790.13 (series). 2M electronic repair saves money by avoiding potential maintenance costs associated with the turn-in of NFE EAs to the depots, repairing EAs at the lowest possible level, and results in an overall improvement to fleet readiness through increased self-sustainability of the repair site itself. 2M is divided into two distinct capability levels.

(1) Miniature Electronic Repair covers the repair of single and double-sided EAs focusing on discrete and multilead, through hole components. Miniature repair includes removal and replacement of these components, removal and re-application of conformal coatings, wiring and soldering of various terminals and connectors, removal and replacement of damaged conductors and printed circuit board laminate. Miniature repair also covers electrostatic discharge (ESD) familiarization and handling procedures to minimize ESD risks to the EAs.

(2) Microminiature Electronic Repair is more technically demanding than the miniature level of repair described above. Microminiature repair involves high-density component packaging, multilayer conductor and laminate repair, flex-print repair, edge-lighted panel repair, welded lead repair and surface mounted technology (SMT) repair. Because microminiature repair is an advanced capability when compared to miniature repair, miniature training is a prerequisite for microminiature training.

(3) MTR Workcenter. A fully outfitted MTR workcenter consists of the following equipment:

(a) Electrical/Electronic Equipment Test Station capable of graphically displaying the relationship between voltage and current across and through an electronic component. The test station software guides the technician through the diagnostic

testing process and displays for comparison the tested component and known good characteristics resident in the database.

(b) 2M Electronic Repair Station consisting of various power and hand tools, a microscope, and miscellaneous supplies and consumable materials required to repair EAs.

(c) A "Piece Parts" Allowance Parts List (APL) containing frequently used repair components.

(d) ESD Control consisting of safety equipment designed to protect EAs under test or repair by discharging electrical potentials residing upon work surfaces and technicians' skin.

c. Program Support. The Naval Undersea Warfare Center (NUWC), Field Engineering Office, Norfolk Detachment, is the Navy's ISEA for the diagnostic portion of the program. Naval Surface Warfare Center (NSWC), Crane Division is the ISEA for the repair portion of the program.

(1) Coast Guard Training Center Yorktown trains Coast Guard personnel tasked with utilizing the program. Training may also be available at various Navy, Marine Corps, or Air Force training sites.

(2) A Coast Guard liaison at NUWC provides various services to ensure maximum effectiveness and utilization of the diagnostic capabilities of the program are realized.

(3) A Coast Guard liaison at NSWC performs similar duties to those of the NUWC Liaison concerned with the repair capabilities of the program.

(4) General program assistance may be available through various Navy Fleet Technical Support Centers (FTSCs).

5. POLICY.

a. All designated shore units (currently selected Naval Engineering Support Units (NESU), Electronic Support Units (ESU), Electronic Support Detachments (ESD), 378' WHECs, and 270' WMECs, shall maintain fully outfitted and certified 2M/MTR workcenters.

b. 2M/MTR stations may be installed or certified at other units with the approval of Commandant (G-SCE) and the appropriate chain-of-command.

c. The equipment shall be maintained in accordance with applicable planned maintenance schedules and controlling documents. Each workcenter shall maintain current

certification in accordance with certification requirements. Each ISEA liaison shall establish procedures for scheduling and monitoring certification.

d. This program is not designed nor intended to replace any existing Coast Guard or Navy Depot Repair programs which will continue to operate under separate charters and policy directives. EAs that are Source, Maintenance, and Repair (SM&R) coded for repair at the depot level will continue to be returned to the depot for repair. Explanation of SM&R codes is contained in reference (a) and in each unit's Management Information for Combined Allowance/Coordinated Shipboard Allowance List (MICA/COSAL) Manual.

e. As funding is allocated, the program office will provide required equipment to outfit approved units designated to maintain a 2M/MTR workcenter.

6. PROCEDURES.

a. Progressive Level of Repair Hierarchy.

(1) All suspected faulty EAs for equipment listed in enclosure (1), shall be screened at the organizational level MTR facility. Those found defective and not SM&R coded for depot repair shall be repaired using the 2M tools and equipment. Certain situations may warrant commanding officer's authorization to conduct organizational level repair of depot level repair coded EAs.

(2) If the organizational level 2M/MTR facility is unable to repair the EA, or if screening efforts are inconclusive, the EA will be sent to the local NESU, ESU, or ESD for further screening and repair due to increased capabilities at these units.

(3) Cutters without 2M/MTR capabilities will send suspect EAs for equipment listed in enclosure (1) directly to the NESU, ESU, or ESD for screening and repair when feasible.

(4) If the NESU, ESU, or ESD screening and/or repair efforts are inconclusive, the EA will be returned to the depot (or discarded if the SM&R code indicates consumable) and a new EA procured by the cutter/unit.

(5) Repaired EAs will be thoroughly operationally (power-on) tested, and if completely functional, shall be returned to the host equipment or placed in shipboard stores. All fully repaired EAs will be considered Condition "A" assets after a successful operational test.

b. Exceptions.

(1) Cutters without onboard 2M/MTR capability and a local NESU, ESU, or ESD may return EAs directly to the depot without screening.

(2) In accordance with reference (b), a faulty EA may be returned to the depot without repair if the cutter, NESU, ESU, or ESD is unable to obtain replacement parts needed for the defective EA within 72 hours. When circumstances permit, return may be delayed an additional 60 days for off-ship component requisition.

7. RESPONSIBILITIES.

a. Commandant (G-SCE) shall:

(1) Serve as Program Manager for the Coast Guard 2M/MTR program,

(2) Provide policy and technical direction regarding the 2M/MTR program,

(3) Establish Memorandums of Agreement (MOAs) with appropriate Navy activities to maintain lifecycle support of existing and future 2M/MTR facilities,

(4) Establish MOAs with appropriate Coast Guard activities to provide funding for support of Coast Guard electronics and HM&E equipment,

(5) Provide funding from the annual NTNO program budget to maintain 2M/MTR program capabilities for the NTNO equipments,

(6) Partner with the ISEA liaisons to monitor the effectiveness of the 2M/MTR program afloat and ashore and adapt to changes in the program and technology to maximize utilization and unit support throughout the Coast Guard,

(7) Implement and require adherence to MTR program policy and procedures, and

(8) Provide life-cycle management of 2M/MTR equipment.

b. MLC (t) shall track MTR components as Coast Guard GPETE.

c. ISEA liaisons shall:

(1) Identify training shortfalls and work with the program manager to ensure training reflects program changes,

(2) Monitor the effectiveness of the 2M/MTR program afloat and ashore,

(3) Analyze data collected via the program's database to identify program weaknesses,

(4) Provide logistics, maintenance, and management support to 2M/MTR facilities, to include assistance to units in maintaining site certification,

(5) Provide follow-on training in the operation and maintenance of the 2M/MTR equipment, and

(6) Identify and assist in the development of new diagnostic data for use in screening and troubleshooting EAs.

d. Unit commanding officers shall:

(1) Ensure all suspected faulty EAs in equipment listed in enclosure (1), are screened prior to returning them to the repair depot,

(2) Ensure at least one technician is formally trained in the operation and maintenance of the MTR equipment,

(3) Ensure MTR stations and personnel remain certified in accordance with reference (c),

(4) Ensure at least one technician is formally trained in the operation and maintenance of the 2M equipment,

(5) Ensure 2M stations and personnel remain certified in accordance with reference (c),

(6) Maintain piece parts allowances, consumable materials, and miscellaneous support items, and

(7) Report all screening and repair actions via a tracking system to the database administrator as discussed in paragraph 9 of this Instruction. Only MTR-related maintenance actions should be reported this way. Other maintenance actions shall be reported in accordance with references (d), (e), and (f).

e. Engineering and Weapons School, Training Center Yorktown shall:

(1) Provide MTR program training as directed by Headquarters training managers, and

(2) Provide 2M training as directed by Headquarters training managers.

8. ENVIRONMENTAL ASPECT and IMPACT CONSIDERATIONS. Environmental considerations were examined in the development of this directive and have been determined to be not applicable.

9. FORMS/REPORTS. The Module Test and Repair Tracking System (MTRTS) software provides the ability to document, track, and generate reports of maintenance actions related to the screening, fault isolation, and repair of EAs. Collection of this maintenance action data will allow program managers to monitor component failure, adjust piece parts APL provisioning, and measure the effectiveness of this maintenance program.

a. NUWC provides the lifecycle support for the MTRTS. This includes software deliveries and upgrades, and collection and compilation of data.

b. All units having a certified 2M/MTR workcenter will report under the MTRTS. All other units will report any applicable 2M/MTR work via their local NESU, ESU, OR ESD.

c. All MTR maintenance actions performed, including screening, fault/no fault found, and repairs accomplished, will be reported using the MTRTS. Reporting instructions are issued with the MTRTS software.

d. The valid MTRTS Quarterly submissions should be received no later than ten (10) days following the end of each quarter. Accomplish the MTRTS backup and email the file to: uscgdata@nor.nuwc.navy.mil

e. Only MTR-related maintenance actions should be reported via the MTRTS. All other maintenance actions should be reported in accordance with references (d), (e), and (f).

ERROLL BROWN/s/
Rear Admiral, U. S. Coast Guard
Assistant Commandant for Systems

Encl: (1) List of Gold Disk covered equipment